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Factor endowments, vent for surplus and involutory process in rural developing economies

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ABSTRACT

This article seeks to provide a new analytical framework based on factor endowments to understand growth in rural economies without structural transformation. More concretely, it explores the variation in farmers' ability to respond to new commercial opportunities. To complement the extensive literature on the economic and institutional effects of factor endowments, this paper revisits two influential yet controversial theories: Mark Elvin's high-level equilibrium trap for areas with high population densities in a closed arable frontier, and Hla Myint's vent for surplus for areas with surpluses of land and labour. We argue that these become more operational if reinterpreted by Boserupian land intensification processes. By lifting the neo-classical constraints on factor relationships, this paper contributes by exploring the mechanisms by which factor endowments might preclude the transformation. Understanding the different dynamics of cultivation in relation to land and labour use, technological choices, saving capacity, and potential linkages to industrialization becomes of even greater significance as these areas may be found within the same countries at a given time.

KEYWORDS

Frontier economies; high level equilibrium trap; agricultural intensification; Boserup and involution

Successful agrarian transformations are a rather recent and exceptional development in history. By 'success' we mean a sustained raise in productivity in the agricultural sector resulting in greater production output, relatively and absolutely, by lesser labour input. No country has managed to sustain a transition from absolute poverty without improving both land and labour productivity in agriculture (Timmer 2009, 2016). This failure in achievement defines the predominant rural trait in poverty and inequality indicators both today and in the past. Unsurprisingly the *modernization* of agriculture, within the greater context of economic development and structural change, has attracted much scholarly attention from economic historians and development economists.

Although economic growth in the rural economy is a necessary condition for structural change, it is not sufficient. This article claims that this may be partly attributable to the dynamics of transformation among traditional rural economies, and not exclusively on

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external factors. We depart from the classification of countries by type of relative factor proportions, which is often used in the related literature. The significant variations in the ability of farmers to respond to the new commercial opportunities, not only among developing regions but *within* countries,¹ is not satisfactorily incorporated in the conceptual and analytical framework for the study of the complex interaction of factors over time. This is of particular significance in the classical discussion on the role of foreign trade in expanding the agricultural land frontier. This paper argues, similarly to the seminal contributions by Ronald Findlay and Mats Lundahl (2017),² for the importance of the expansion of the agricultural land frontier in increasing world trade volumes, particularly from the mid-nineteenth century, but also raises questions about the factors behind the differences in performance in agriculture and their relationship to structural change in the majority of countries that did not ‘catch up’. These are indeed fundamental but contentious questions: what were the processes that led to rapid and substantial increases in surplus capacity for exports? How can we explain the role of the frontier vis-à-vis trade? And, contrarily, what were the dynamics in areas of relatively high population densities? Subsequently, what was the relationship between the so-called traditional rural economy and the new commodity export economy? In order to address these questions, this paper aims to contribute by developing a new analytical framework based on factor endowments. Our main argument has three components.

First, the literature focusing on rural economies traditionally distinguishes between areas of high and low population densities (or frontier economies). This paper will contend that although the dynamics of growth under those distinct conditions vary – that is, there are substantial constraints in cultivating at the intensive or extensive margin – both processes require labour intensification (yet labour productivity would vary). Thus, by revisiting Boserup’s (1965) thesis, we claim that the neo-classical constraint of factor proportions should be lifted to come closer to actual processes of labour allocation within the farming household and at a macro level. In other words, the cultivation can be simultaneously labour- and land-intensive. Second, population densities, as a concept frequently used in the new institutional economics literature as an economic proxy for income per capita, may be misleading in predominantly rural or agriculture-based economies. From an economic perspective, person³-to-land ratios (understood as agricultural land, not a political territorial indicator) are more representative of the economic conditions that determine the cultivation techniques and practices, usually under limited capital. Obviously, the overall agricultural land is a political concept, especially when discussing frontier expansion, but it is also *dynamic*, as it is linked to the technological capacity (not least to intensify its use) and price levels at a given time. Third, if no major technological change occurs, as the land frontier closes and

¹This is partly embedded in the dual economy conceptualization applied to a differentiation within agriculture: a traditional subsistence economy versus a modern production (e.g. Boeke 1953; Drabble 2000, 36 for Malaysia; Brocheux and Hémerly 2011, 250–251 for colonial Vietnam).

²See more in chapters 9 and 10, and also Findlay and Lundahl (1994). Their work focuses on the period 1870–1914, ‘The Great Specialization’ in world trade (Findlay and O’Rourke 2007, 365–428), which has been the empirical basis for much economic theorizing on the role of trade. The 1920s was, for many of the tropical economies, another period of economic trade bonanza, but most of the economies suffered substantially from the Great Depression (see Boomgaard and Brown 2001), from which the recovery period varied amongst countries.

³The choice of use of ‘person’, instead of the traditional ‘man’, is purposive as to minimize any doubt of the dynamic gendered division of labour in farming (see particularly Boserup 1970, 3–24; Hopkins 2019[1973], 287; Akyeampong and Fofack 2012; van Nederveen Meerkerk 2019).

surpluses are exhausted, maintaining production capacity and subsistence becomes labour-absorbing. This, we argue, is better understood as an involutory process, which in turn may hinder the possibility of an endogenous process of structural transformation.

The main implication is that if we consider changes in demand as exogenous to the traditional rural economies in the periphery, we claim that the response to new commercial opportunities and potential improvement in living standards of the local farming population is partly conditioned by how labour-intensive the cultivation of the subsistence crop was. Initially, at least, this conditions how labour is allocated (given a lack of major institutional barriers determining land cultivation and labour movements). Findlay and Lundahl (2017, 286–287) classify the periphery, in contrast to a selected industrializing European core, as (i) recent settlement, which includes mainly the US, Canada, Australia, and Argentina; (ii) plantation economies comprising tropical countries, before mainly at subsistence, that specialized in cash crops developed by foreign capitalists and run in large states; and (iii) ‘peasant’ export economies where native peasants moved from subsistence to export production of tropical commodities.⁴ This paper relates to the last two, as we are interested in the transformation of the traditional economy – particularly its transformation from subsistence – but contend that these two categories, such in the case of Malaysia, could co-exist and are arguably interacting in their transformation (not least via the use of labour). Furthermore, our contribution is to bring to light the different constraints imposed by factor endowments on the potential linkage effects (or lack thereof) to industrialization and structural change in developing economies.

1. Factor endowments and institutional change: Setting the empirical scope

There is an extensive body of literature that identifies *favourable* person-to-land ratios as a fundamental cause for triggering countries’ successful economic development (e.g. Allen 2009a; Baldwin 1956; Habakkuk 1962; McLean 2012; North 1966; Temin 1966; Watkins 1963). Their factor endowments were not, however, the only necessary factor driving the remarkable transformation and hence divergence in economic performance. In Watkins’ (1963, 143) words, ‘an absence of inhibiting traditions’ characterized these economies (mainly the US, Canada, and Australia). Thus, given the periodization of these contributions, we first ought to divide those that were under colonial rule versus independent states, since we could easily argue that the former had a greater distorting role.

The pervasive institutional effect of colonialism in relation to population densities is the core argument by Acemoglu, Johnson, and Robinson (2002) and Acemoglu and Robinson (2012). This institutional mechanism has been more extensively examined by Engerman and Sokoloff (1997, 2002, 2005, 2012), claiming that the abundant land-to-person ratios that the colonizers ‘found’ in the Americas led to the establishing of institutions to restrict labour (*encomienda* system) and import labour (slavery). These, along with climate conditions that facilitated economies of scale, resulted in the formation of plantation economies and institutions that limit breadth of access to opportunities for

⁴For a detailed empirical investigation on agricultural development in the periphery see Pinilla and Willebald (2018).

socio-economic advancement. Even after independence, there has been institutional persistence via restrictions in, for instance, education and suffrage.

Whereas there is no denying the importance of extractive colonial institutions, nor the complexity of actors (indigenous and colonial), interests, and trade relationships under colonialism, the analysis in this paper complements their influence with a focus on the agricultural dynamics, both in the capacity of generating a surplus (and hence taking advantage of international demand) and the distribution effects. Consequently, there are economic, technological, and institutional factors at play that outspread beyond colonialism. Many, if not most, of the colonial economies that were part of the commodity export boom during the Great Specialization became integral to the latest wave of globalization after substantial technological change in agriculture.⁵ Our proposed understanding could also then be applied to non-colonized countries during the Great Specialization, such as Siam (Thailand), as an example of a frontier economy, and China, which contains areas of very high population densities. Gareth Austin (2008) proposes and examines the factor endowments perspective to explain Sub-Saharan African economic development in the long term. Understanding the relationship between factor endowments and cultivation techniques and practices is a necessary next step.

2. Factor endowments and induced development: A revision

One of the most influential theories based on factor proportions is Yujiro Hayami and Vernon Ruttan's induced development model. They claim that technological change leads to continued productivity growth as a result of a process of adjustment to the original resource endowments and resource allocation. Their work is primordially based on the cases of Japan and the US, while their explanation for the failure of other Asian colonial economies is partly institutional. They claim that the inter-sectoral income transfers were used for the benefit of the metropolis and not the colonial economy (Hayami and Ruttan 1985, 439).

Consequently, assuming factor proportions as the initial conditions, the counterfactual to be discussed is: had it not been for colonialism and its surplus extractive institutions, rural economies probably would have experienced technological change induced by the scarcity of land or scarcity of labour. According to the Hayami and Ruttan (1985) induced development model, this technological change would have led to continued productivity growth as a result of a process of adjustment to the original resource endowments and resource allocation, thanks to 'the capacity to generate an ecologically adapted and economically viable agricultural technology in each country or development region' (Hayami and Ruttan 1985, 4).

In contrast to Hayami and Ruttan, we argue that there is also a logic in the economic dynamics derived from factor proportions, which could partly hinder economies from modernizing their agriculture. The two analytical models developed here are built on two theories: Elvin's (1972, 1973) high-level equilibrium trap (HLET) and Myint's vent for surplus (1958). These two theories are as influential as they are controversial. They can, in effect, be considered as two opposite extremes. Whereas the latter's premise is

⁵See Ishikawa (1981), and particularly Southeast Asian transformation from commodity exporters to industrializing economies in Bassino and Williamson (2017).

surplus of both land and labour, the former is a theory of diminishing surplus labour (measured as person-hours) in a closed land frontier with increasing population. The implications for further transformation are equally distinct. The HLET has a strong bearing in the capacity of the rural economy to generate a surplus, and consequently, becoming in itself less dynamic and a potential obstacle to industrialization (as labour becomes scarce). In contrast, the vent for surplus is itself a theory designed to explain a growing surplus generation, but without leading to significant technological transformation; the dimension on how the surplus was distributed is nonetheless important, but not considered in Myint's theory.

These theories, and the literature they inspired, are still influential (e.g. Austin 2014a; Findlay and Lundahl 2017; Gunnarsson 2018) and are applied to the understanding of cases that were part and parcel of the Great Specialization (e.g. Ghana, French Indochina, Indonesia, Myanmar, Malaysia). This paper is not, however, aimed at testing these theories to explain the transformation of these economies during this period. The end result of the coming analysis is to obtain what Gershenkron (1962, 6) called 'empirically derived hypothetical generalizations', which partly concretizes in a set of analytical parameters that can be further discussed empirically to these cases. By reinterpreting these theories, we seek not only to make them more operational but also to argue that they share a common denominator: that the required labour intensification linked to land intensification might lead to an involutory process. This, we argue, may have direct effect on the possibility for economic development in the long run.

Returning to the empirical literature, the opening of most of these economies to foreign trade from c. 1870 onwards, whether under a colonial regime or not, is often presented as an opportunity for greater commercialization of the existing rural economies, especially those whose *traditional* crop increased in demand (e.g. rice, cocoa, nuts). This is the result of the increased possibilities of exports and major improvements in transport (i.e. infrastructures and technology) that significantly reduced costs, while prices were favourable to producers. The key aspect, however, is to establish how factor proportions might have determined the capacity to produce a surplus. Considering the significant differences in land availability, given traditional technology, the processes to achieve increases in output per capita ought to be different. Establishing labour surplus and the ability of agriculture to absorb it (especially if only seasonably) is of greater relevance in this period of extensive demographic change (see Lee 2003 for a global overview since 1700).

The initial conditions of many parts of Asia (e.g. Red River Delta, Java, Yangze Delta) were increasingly high population densities in a closed arable land frontier, while the frontier lands of Cochinchina, parts of Siam, the Irrawaddy Delta in Burma, parts of Malaysia and Indonesia, and the so-called 'peasant' colonies of tropical Africa (see Dumont 1957), had abundance of land relative to labour.⁶ Normally, the literature would discuss the possibilities of extensification in the case of the latter, and intensification for the former. We, however, take a Boserupian stance and argue that both processes should be considered to be land intensification, independently of whether one cultivates in the intensive or

⁶Discussed by crop, see e.g. Clarence-Smith (1996) for the expansion of cocoa since 1800 or rice in Bray (1986) and in Bray et al. (2015); for an overview of two of the most cited cases of coexisting regions with high population densities and frontier expansion during colonial times, see Gourou's works (1945, 1955) and Brocheux and Hémerly (2011, 197, 280) for French Indochina, and MacAndrews (1949) and Booth (2016, 12–34) for Indonesia.

extensive margins of production (in classical terms). Boserup's (1965) contribution to the understanding of agricultural transformation is twofold. First, land is considered a more elastic factor than previously held and, second, both processes of land intensification come, at least initially, at the expense of labour productivity. This stance consequently points at a more complex relation between processes of land and labour intensification than a simpler (neo)classical standard model of a relative relationship between the two factors. The implication for our proposed framework is that it allows us to introduce a dynamic and stage-wise understanding of agricultural and rural transformation. This will be developed in more detailed below.

3. The two processes of land intensification

Ester Boserup, in her 1965 work *The Conditions of Agricultural Growth*, laid out a theory based on the postulate that population pressure leads to technological changes in agricultural production. She claimed that as population grows and puts pressure on the existing land and production techniques, living standards worsen, threatening the survival of the population. The result is a process of 'intensification'.

Intensification, under this framework, is exclusively linked to land and its use. In order to increase the production output to feed the growing population, the farmers can put more land under cultivation and/or shorten the fallow period. This is most likely done at the expense of labour productivity (Boserup 1965, 41), because more labour inputs are assigned to indirect tasks of the agrarian production, such as land preparation, manuring, and weeding. Consequently, these processes of intensification come at a greater social investment. Eventually, as the returns to land diminish due to natural degradation, new innovations will be required to maintain the quality of the land, which is now under more intense cultivation. If these innovations are not carried out, underemployment in agriculture is likely to increase, and people may see their choices limited to starvation or migration.

In other words, any increases in output per cultivated hectare, independently of the strategy for (land) intensification, would likely come at the expense of output per person-hour for all cultivators, at least initially.⁷ This is better understood if two possibly detrimental effects are considered. First, the new area under cultivation is likely to underperform initially (both low output per arable hectare, and low output per person-hour). Second, the release of labour strains the 'old' cultivation system, which was likely accommodated to a different level of land and labour intensification. Boserup argues that farmers ought to change their behaviour as a response to the now more land-intensive cultivation system – but here lies one of the greatest challenges to her theory. Even if one believes that the subsistence threat (as argued by Clark and Haswell 1964) is a significant incentive for that change, it is not obvious that it will be sufficient to achieve a shift in the production possibility frontier. This brings us to the challenge of reconciling Boserup's theory with the possibilities of being trapped via involutory processes. This will be discussed in more detail below.

⁷The evolution of labour productivity would be dependent on the cultivation cycle and demands of each crop at a given technology.

Boserup's theory should be understood as an endogenous process of transformation. She is attempting to explain the effects of population changes in pre-industrial agriculture (Boserup 1965, 14), which leads her to adopt the logic that population pressure is a necessary condition for agricultural transformation. However, when analysing countries that have been colonized, colonialism is arguably an exogenous factor that may potentially alter the functioning of the economy and create new dynamics. It is here that the importance of the initial factor endowments of the colonized countries becomes most relevant. Colonial powers would have responded to these conditions, leading to different strategies to engage in surplus production.

In the cases where (arable) land was scarce in relation to labour, the expectation would have been to intensify land use (e.g. multicropping). For the frontier economies, the intensification strategy would have been to put new land under cultivation. These conditions were bound to have a distinct impact on the possibilities and paths of change once these economies were colonized. This would have taken form in the choices of capital formation in agriculture and allocation of labour for different actors of the economy, for instance by reallocating the seemingly excess labour of some regions to the frontier economies. Hence, we claim that the related effects of colonialism, particularly the increasing international trade (applicable also for independent states), can only be assessed inasmuch as the limitations and possibilities of each cultivation system for obtaining higher output per capita are equally understood, not least in relation to subsistence.⁸ These limitations and possibilities define the constraints and economic opportunities of the actors.

4. High population densities in a closed arable frontier: The high-level equilibrium trap

One commonly observed economic phenomenon, both in the past and today, is that in areas with high population densities and at subsistence, a seemingly excess labour force does not leave agriculture. Examples can be taken from areas in colonial India or Indonesia, as well as outside the colonial world (Higgins 2012; Lal 2010; MacAndrews 1949) and even Europe (e.g. De Graef 2016; Dumont 1957).

Before we discuss this further, it is important to note how subsistence is defined in this paper. The conceptualization is not completely unproblematic. The related literature often discusses subsistence as a sector of the economy characterized by self-sufficiency, having limited *systematic* exchange amongst the actors (see Myint 1964, 44). This paper considers it as an outcome measure; that is, part of the population may be living at a minimum subsistence level, which may be as a result of either technology and resources (un)availability or institutions in place that may leave this part of the population with limited surplus above subsistence incomes. Undoubtedly, these are not opposing interpretations. One cannot ascertain whether there is a subsistence sector in the economy without observing and measuring the part of the population that seems to

⁸Austin (2017, 101–108) argues that Sub-Saharan Africa transformed from a predominantly land-extensive, with some elements of intensification, path of development to one led by intensification in the twentieth century (especially as a result of European settlement). The introduction of new crops, especially those initially from Asia, seemed to have taken place in the extensive margins by lengthening the agricultural year, that is, by increasing the amount of labour input (see hours) per year (103–104). This concurs with our labour intensification proposition in relation to land intensification.

barely reach subsistence income levels. However, this paper argues that once these economies are exposed to new economic opportunities, the fact that the literature identifies a (remaining) subsistence sector should be subjected to investigation – i.e. what are the factors (technological and/or institutional) that keep the population at those levels? In other words, we work under the premise that (remaining at) subsistence is not a general choice. When we discuss areas of population pressure on arable land at subsistence levels, we claim that this outcome can be attributed to an involutory process. Key to its understanding are the works done on Chinese agriculture.

Elvin (1973, 314), in his study of medieval China, argued that this situation could be described as a high-level equilibrium trap. Starting with a premise of constant land (a closed arable frontier), the potential agricultural surplus shrinks, first relatively and then absolutely, as population grows given the existing technology and practice. As population grows and returns to labour and technology diminish, an equilibrium is reached where population is at subsistence level. Any changes in practice, at a given technology, will eventually lead to diminishing returns and a closing of the output potential surplus as labour inputs grow; hence the trap. This is a high-level equilibrium trap, as land productivity is at its highest given the existing technology and input-output relationship, but *at low levels of welfare*.

We claim that, to a great extent, Elvin represents Boserup's argument for pre-modern China, and locates it at the final stage of intensity of land use given traditional technology. The exception is that once the economic system reaches the trap, the opportunities for innovation within the system are sharply reduced, even to the extent that they cannot be generated endogenously. He contends that as the Chinese rural population grew, more land was put under cultivation and fallow periods were shortened. This led to population growth (expansion of the market) but without substantial increases in purchasing power; that is, rural households' real disposable incomes did not increase. On the contrary, incomes were likely suppressed towards subsistence level. As effective demand was not significant enough, despite the large population in China, innovative change was becoming harder to adopt. Factor proportions and prices were changing to the detriment of capital investments. Even though new agrarian technology was being developed in Britain (based on crop-raising and animal husbandry) or in the US (mechanization), China's population had expanded to a level where the necessary access to land was not an option for incorporating such technologies. Elvin's work seems to indicate how high population densities might become detrimental for an endogenously driven growth. The population is driven towards subsistence and falls into a Malthusian trap,⁹ which, in turn, hinders structural change.

4.1. Growth versus involutory processes

Being at an HLET does not preclude periods of economic growth, but once population starts growing and putting pressure on the new innovation, processes of intensification will occur. This may potentially lead to increases in land productivity, but at the likely

⁹Malthus (1798, 101–102) had already argued for China's overpopulation in relation to its resources and conjectured that land productivity must have been at its highest then. Unlike Elvin, he claimed that the country's wealth had been long stationary; Elvin presented a more dynamic, however limiting, transformation of China during the period.

cost of labour productivity. In our view, this is a Boserupian argument. At this stage, diminishing returns to the new innovation will both absolutely and marginally start to come into play, which in turn will return the population back to subsistence levels. Ultimately, the marginal returns to labour will become almost zero.

This process is known as ‘involution’, which is a controversial concept and often associated to Clifford Geertz’s work on Indonesia. He defines it as ‘the overdriving of an established form in such a way that it becomes rigid through an inward overelaboration of detail’ (Geertz 1963, 82). Geertz does not really discuss the cultivation system per se, but rather asserts that the Javanese irrigated rice cultivation *seemed* able to absorb increasing amounts of labour per hectare. He suggests that it was the extraction of surplus by colonial powers, along with the above-mentioned ecological characteristics of the cultivation system, that led to a situation of ‘shared poverty’. This is a result based on complicated changes in land tenure and farmers’ behaviour within the village economy, and lack of substantial acceleration of agricultural productivity.

As pointed out by White (1983, 20), Geertz’s involution could be considered a taxonomic concept of change; it is difficult to operationalize or even to theorize.¹⁰ After all, not all colonial policies led to the same outcome in the peasant-based rice economies. Hayami and Ruttan do not offer much assistance in this respect. They claim that ‘most developing economies face *the choice* between the historical examples provided by Java and Japan – between involution and development’ (Hayami and Ruttan 1985, 298; italics added). They contend that there were several reasons for the failure of colonial countries to transform agriculture. First, the distortions of markets and factor prices carried out by colonial and post-colonial governments were a core problem. Second, the lack of investments in education and human capital formation within agriculture hindered technological innovation and diffusion. Third, the transfers from agriculture to ‘non-viable industrial sector or a non-productive military and administrative bureaucracy’ obstructed linkage effects (Hayami and Ruttan 1985, 440). Although Hayami and Ruttan accurately describe a common phenomenon or well-identified problems, it is not completely clear why the development paths (between development and involution) become a matter of *choice* as indicated in their argument.

One of the most comprehensive efforts to apply the concept of involution has been carried out by Huang (1990) in his work on China. In general terms, Huang defines involution as a process of growth without development; that is, output increases, but at the cost of diminished marginal returns per workday (Huang 1990, 11). Huang then refers to the possibilities of Chinese agriculture to increase output, but without significant improvements in labour productivity and income per capita. This phenomenon, he posits, characterizes China from the fourteenth century to 1978. He divides the period into two main phases: one of involutory commercialization, followed by collectivist involution.

Huang’s contribution is twofold: first, it comes out partly in support of Elvin’s HLET, although Huang argues that contact with the West is insufficient to break out of involutory processes; second, it provides a clearer definition of involution than Geertz’s. His view of involution is as a process that makes the concept less taxonomical, and as one of three patterns of development – the other two being intensification and development. Intensification is when ‘output or output value expands at the same rate as labour

¹⁰See Boomgaard and Kroonenberg (2015) for a revision of Geertz’s thesis to the case of Java.

input' (Huang 1990, 11). He considers that intensification to be Boserupian, driven by population pressure while 'in contrast to intensification and involution, development generally occurs with not just increased population pressure, but an efficient division of labour, increased capital inputs per unit labour, or technological advance' (Huang 1990, 12). Although this statement does not initially affect his definition of involution, it brings some confusion to his interpretation of Boserup and a point of differentiation with our claim.

As already indicated, Boserup promulgates that population pressure leads to processes of (land) intensification (otherwise, as the population grows, people would either starve or migrate). However, she points out that 'output per man-hour is more likely to decline than to increase [...] when a given population in a given territory shortens the fallow period and changes its agricultural methods and tools correspondingly' (Boserup 1965, 41). Whereas this statement could be considered as inconclusive, she states:

a period of sustained population growth would first have the effect of lowering output per man-hour in agriculture, but in the long run the effect might be to raise labour productivity in other activities and eventually to raise output per man-hour also in agriculture. (Boserup 1965, 118)

This ambiguity might lead to confusion, but we consider that diminishing marginal returns to labour (closing on zero) are necessary, but not sufficient, for involution to take place. It may come down to a matter of semantics, but the implicit idea is that involution is a process that takes one farther away from their potential (Little 2010), and that there is an implicit trap mechanism. Huang (1990) himself presents a potential mechanism via the *familization of rural production*. Women and children become more active and indispensable in the economic activities of the household.¹¹ This, unlike the positive interpretation associated with the proto-industrialization of early modern Britain (Mendels 1976), or Japan's labour-intensive development path (Austin and Sugihara 2013; Sugihara 2003, 2019), is a response to achieve subsistence. Household production includes, for instance, a movement towards cash crops (e.g. silk in China), and leads to a common trait of subsistence households: diversification of economic activities within a household, but with minimal commercialization¹² (Eicher 1970).

In sum, HLET does not exclude opportunities of economic growth. Nonetheless, being in the trap means that technological innovations are not sufficient to outrun population pressure, leading to involution¹³ and keeping the population at subsistence. The fundamental question is what makes it a trap.

¹¹See more recent research on this matter in Carmichael, Dilli, and van Zanden (2016).

¹²For the case of the Red River Delta, Gourou (1945, 1955) reported that much market activity happened, but the amounts traded were very limited. This is likely because of the seasonality of production and limited diversification of the rural economies.

¹³Boomgaard and Kroonenberg (2015, 72), in the context of Java, argue that the situation of farmers in Java (areas of high population growth, small average landholdings, high yields on the smallest holdings) 'was the result of traditional agricultural intensification by smallholders (partly Smithian, partly Boserupian growth)'. But Boserup's theory seems incompatible with falling trapped and does not assist us in understanding why farmers in these economies did not incorporate the new technologies that would have moved them to the next stage of transformation in her own theory (this would only take place until the Green Revolution decades later).

4.2. A low- or high-level equilibrium trap?

The concept of a trap is a rather static one (even though it may comprise a long period of time). And the qualification of China's (and other Asian economies) *traditional* agriculture as being trapped at a low- or high-level equilibrium highlights both the complex relationship between factor endowments, technological innovation and adoption, and diverse welfare measurements, as well as the importance of distinguishing between mechanisms and observable outcomes.

To the best of our knowledge, only one other study has discussed the difference between low- and high-level equilibrium traps in this context. Arrighi et al. (2003, 320, n 1) reinterpret Elvin's HLET as Smithian, while the low-level equilibrium, they argue, is Malthusian. They appear to differentiate between them based on resulting income levels; in the higher, the potential for efficient growth has been exploited, but the country is at historically high levels. This is an intuitive interpretation of the difference between the traps. One should, however, be cautious when attributing maximum output relative to inputs as higher income per capita in the HLET (though they might be at historically high levels in absolute terms). After all, Elvin believes that this had led Chinese farmers to subsistence with limited disposable income. Equally important, if production, trade, and income could not grow further, as they state, the cultivation system was vulnerable. If population expanded rapidly or there was a failure in production, the expected outcome would be insufficient production that could lead to a Malthusian-type food crisis. Famine and starvation were frequently reported in rural areas with high labour–land ratios. Under these conditions, any growth of population would likely depress returns to labour, which is how they defined a Malthusian (low-level) equilibrium trap.

This difference in interpretation from our proposed approach has larger implications. Attributing greater disposable incomes to farmers supports the argument that there was a domestic market with a substantial effective demand, which could be the driving force for the first stage in Kaname Akamtsu's theory of catching up (1962) (that is, a demand for imported industrial products), whereas the opposite interpretation signifies the impossibilities of meeting the premises for industrialization, and even of structural transformation (as labour cannot be released from agriculture).

As we argued above, Elvin's HLET may be rendered more operational if Boserup is reintroduced. The threat of subsistence, under this particular resources' endowment, may induce farmers to innovate. This is an intrinsic component to Shigeru Ishikawa's propositions on increases in labour absorption in agriculture. He illustrates the types of activities and labour allocation in a selection of pre-modern Asian cases (see before the introduction of high yield varieties) (Ishikawa 1981, 15–31). The result is a cultivation system that might sustain the existing population and some population growth, but historically the patterns are best represented as a rectangular, 'subsistence', hyperbola (Ishikawa 1967, 78–82).¹⁴ This means that if we represent land and labour productivities (per-crop per-hectare yield of rice to per-crop per-hectare labour input in rice production), the magnitude (by multiplying the yield by the area under cultivation per farmer) for each curve under these conditions was constant and at, or close to, subsistence level. The

¹⁴Japan, from the early Meiji period, is the only country of the sample farther off the subsistence hyperbola (Ishikawa 1967, 82).

implication is that land productivity could increase (for instance, by shifting curves), but this, we contend, can be achieved only at greater labour intensification. In Elvin's formulation, labour is indistinctly treated as units (people) and working hours, but these two measures of labour productivity, we argue, should not be used interchangeably.

Let us assume that a new innovation takes place and is 'available', and that, hence, the production function is lifted. We cannot take for granted that farmers will immediately be at that level. Boserup argues that this would be done at higher costs per labour unit because, in this understanding, the new production function is more (land-) intensive. If farmers do not intensify the production, would this constitute a low-level equilibrium trap? According to Nelson (1956),¹⁵ this type of equilibrium is reached when 'existing inputs are not producing the maximum amount of output that man's knowledge will allow'. Nelson suggests that if economies are stimulated, there could be an increase in output/incomes without further increases of inputs. Thus, if one were to interpret Elvin in terms of labour units (workers), and not person-hours, it could be argued that since the way to break free from the quasi-equilibria is via changes in practice (given the inputs and output potential at a given technological frontier), these could be theoretically considered low-level equilibrium traps.

This understanding is, however, a static and incomplete view of the phenomenon under study. It is static because, at a given point in time, there could always be room for a reduction of inefficiencies of practice – but it does not help us understand why there are inefficiencies and how they have been evolving over time. It is also incomplete because, as Elvin himself states, the trap closes as the margin for a reduction of those inefficiencies declines over time in absolute and marginal terms. We contend that the quasi-equilibria should not be understood as low-level equilibrium traps because the change to a higher production function would come at the cost of greater labour inputs, measured as person-hours, which is contrary to the definition provided by Nelson (1956).

Consequently, the key difference between the two traps is that land productivity is highest in HLET, given the existing technology and input-output relationship. In this way, the economic system can maintain a higher population density, and even some urban population. What constitutes a trap – similarly to a plausible low-level equilibrium trap – is that it is Malthusian. If population were to grow above the equilibrium, considering that labour inputs (both in hours and absolute numbers) are almost fully employed¹⁶ in a highly land-intensive use, it would possibly suffer from positive checks and return to equilibrium. In other words, the possibility for labour reallocation becomes limited.

4.3. HLET and two caveats

There are two caveats to address when discussing the HLET. First, HLET and Huang's thesis are inferred from Chinese evidence. That China was suffering from a (Malthusian) HLET is contested. There are two main angles in the counterarguments to Elvin's and Huang's position. First, there is the Great Divergence debate, with authors such as Rawski (1989)

¹⁵Nelson (1960) takes the case of Japan as an example of escaping a low level equilibrium trap, whereas Sugihara (2003, 92) argues that Japan had fallen more deeply into Elvin's high level equilibrium trap than contemporaneous China.

¹⁶This is not incompatible with labour seasonality, but the necessary production to feed the population under those market, cultivation, and general economic conditions is met with high labour inputs.

and Brandt (1989) positively revising the degree of agricultural output and living standards, which links closely with the position of Pomeranz (2009). The latter claims that Chinese and English countryside was comparable in the eighteenth century; Allen (2009b) reports that although Chinese land productivity was much greater than that of the English, labour productivity (measured as output per day work) was about 90% in c. 1820 and that household agricultural incomes had declined from 1620 to 1820. Second, there are works that challenge the Malthusian interpretation of China by maintaining that population actively controlled fertility, and hence population growth cannot be regarded as the limitation for Chinese transformation (Bengtsson, Cameron, and Lee 2004; Lee and Campbell 1997).¹⁷

In relation to the first aspect of the debate, the greatest limitation is that the conclusions are inferred mainly from the lower Yangzi region. The significance of this region is noteworthy (as the Red River Delta is for rice production in Tonkin, or Java for Indonesia). The challenge is that both camps are empirically refuting their findings for the earlier period, while Little (2010, 191) concludes that farm productivity and output were outpaced by population by the early twentieth century. Ishikawa (1981, 27), based on John Buck's surveys, concludes that the magnitudes of person-days applied to rice cultivation were relatively large – which, in turn, might reinforce the involutory argument. The implication of such a phenomenon is greater than the effect on the living standards of the farmers in the region, and significant for the potential of structural transformation in China. This takes us to the second aspect of the debate and the different objectives of the research. Elvin (1973) and Huang (1990) attempt to provide an explanation as to why China did not significantly industrialize (until recently); in this framework, population growth becomes detrimental to a cultivation system that was not benefiting from substantial technological change. The other works (championed by Lee and Campbell 1997) have population and its changes as their research focus. Whereas it is valid to argue that the Chinese population had a mechanism with which to respond to negative conditions, i.e. delaying marriage, it may be insufficient to explain the vulnerability of the cultivation system given that China experienced significant population growth during these centuries. The complexity is greater as the interplay of economic, social, and environmental factors is significant. The evidence points at a certain fragility of the system when the country experienced significant population growth, which in turn put pressure on land and its use. This made the cultivation system more vulnerable to harvest failures and flooding, and consequently posed a subsistence threat.

At HLET, changes in practice to increase production per capita may lead to a subsistence threat. The economic system cannot generate enough demand for labour out of agriculture at the same time as land intensification via shortening fallows leads to a reduction of labour availability. The end result is a marked seasonality in the employment of rural labour. In addition, the supply of labour is extensive, which pushes prices of labour (wages) down, resulting in low opportunity costs of labour. This leads to a self-reinforcing mechanism, where land productivity is high at the expense of labour productivity, but it must remain high to feed the population. Thus, as discussed earlier, labour intensification hinders its productivity and release, which is a necessary condition for a successful agrarian transformation.

¹⁷For a more detailed analysis of this debate, see Faran (2011) and Little (2010).

The second caveat comes from the works of some authors, influenced by Lewis (1954), who contend that the observed outcome (extensive rural population at subsistence) conforms more to the idea of disguised unemployment and underemployment. The marginal productivity of labour is zero, and it is employed in low-productivity activities, implying that it could be released without a substantial loss of output production (Fei and Ranis 1961; Jorgenson 1961).

Our study is not the first to counterargue this assertion (e.g. Schultz 1956; Warriner 1955). The cultivation system adapts to the availability (or lack) of either factor. As population pressure constrains the availability of arable and cultivated land,¹⁸ increases in land productivity lead to labour scarcity. Hence, in order to transform, one may argue that labour-saving technology should be as necessary as land-saving technology; otherwise, as labour is 'released', production capacity is compromised and so is the subsistence of the population. The key would be to increase labour productivity in a two-stage plan: first, through labour-absorbing innovations, which could soften the peaks of cultivation and increase income per capita (and potential for savings-investments as well as linkages in the economy). Second, thanks to labour-saving technologies, labour could be released from agriculture (e.g. Ishikawa (1967) for the cases of Japan and Taiwan, Booth and Sundrum (1985) for an extended sample of Asian countries, and López Jerez (2019) for Vietnam).

4.4. Macro and micro implications and derived analytical tools

We suggest, similarly to Huang, that the commercialization that characterized the Great Specialization period was insufficient to transform the already densely populated and at-subsistence economies.

HLET is concerned with macro processes, but there is a micro-level implication. If land, as a closed factor at a given technological level, is exposed to population growth for a prolonged period of time, an expected outcome is intense land fragmentation so as to maintain high yields. This tends to become more acute if, due to inheritance practices, land is distributed amongst heirs. The consequence is excessive parcelling (within-household land fragmentation),¹⁹ which, in turn, may make investments in modern (industrial) inputs unprofitable, independently of the existence of technology. This, consequently, shifts the focus of the problem towards the profitability of such investments. There are two aspects to consider. These farmers are at subsistence with limited disposable incomes to purchase modern inputs, but, equally importantly, there may be economies of scale in utilizing these that the farmers, due to the land fragmentation, cannot achieve.

¹⁸The distinction between these two is significant. Based on Fao's definition, arable land – as an indicator – includes only temporary crops (double-cropped areas are only counted once). Permanent crops (like cocoa and coffee), which do not require annual harvest, are part of the cultivated area. This has direct implications in our understanding of labour allocation, particularly when farming households have not yet specialized and combine subsistence production (in arable land) and permanent crops cultivation.

¹⁹Based on archival records, López Jerez (2014, 132) reports on the extent of parcelling in Tonkin, reaching 16 million parcels in 1937, and 17.7 million in 1941. The fragmentation of land was reflected in the division of 1,229,200 ha into 13,793,000 parcels, amounting to less than 0.089 ha on average. The excessive small size of landholdings is reported also for Indonesia (Collier, Soentoro, and Yuliati 1982; Boomgaard and Kroonenberg 2015), and for regional differences within Burma (see Chen 1968); for China see Chao (1986, 94–101) who argues that the historical records support the same conclusion, and notes that fragmentation is likely an outcome of the equal distribution of land productivity (not necessarily land size).

Elvin would suggest that if excessive parcelling is the obstacle to overcome, there should be room for changes in practice and consolidation of land within each household. Here, we contend that excessive parcelling may create suboptimal conditions that are likely to be path-dependent. These conditions are intrinsically linked to high population pressure, and soil fertility and its variation over time. The problem of excessive parcelling tends to be overlooked by much of the literature on agriculture. This is due to the fact that these studies normally consider land per household or farm, which is an aggregate measure that could well overshadow the hindrance that excessive parcelling constitutes. This is how factor endowments may have a long-term effect in economic transformation.

One of the greatest challenges when discussing the possibilities of ascertaining that a region was or is reaching HLET or experiencing involutory process is that it must be an observable phenomenon. Given that one of the indicators is that the population is at subsistence, many of these regions and rural economies have constituted the 'subsistence sector' in the literature. To bring greater analytical depth, we propose the following indicators. At the *macro, aggregated* level: (i) a high land use system, given traditional technology; (ii) a labour-intensive agrarian system, but affected by decreasing returns to labour; and (iii) as population grows, a reduction in the surplus available above subsistence per household. These hinder investments and the creation of effective markets for goods and services. The outcome is that there is little surplus of marketable products, and in any case the homogeneity of the production pushes prices down. Indicators at *micro* level would be (i) the familization of rural production, even with below-subsistence returns to labour (Chajanov 1966; Huang 1990); (ii) excessive fragmentation of household land; and (iii) diversified production to meet subsistence requirements.

In sum, an important indication of the existence of a trap is when 'innovations' take place, but labour productivity does not increase; that is, the economy experiences involution. This has clear implications for the industrialization of these economies. First, labour is not fully released (since the peaks of cultivation might require most labour inputs), while other linkage effects – such as savings or excess production for a non-rural population – are restricted, as the surplus capacity of these economies is rather limited. Under these conditions, it is hypothesized that the outcome will be that the majority of the population are at subsistence. In these conditions of limited land and labour surplus, high population densities should not be considered as connoting higher incomes per capita, and hence any significant efficient demand for industrial produce and dynamic sectoral transformation.

5. Abundance of land-to-person ratios in an open land frontier: A vent for surplus?

In his seminal work, *The 'Classical Theory' of International Trade and the Underdeveloped Countries*, Myint (1958) provides a revised version of Smith's classical theory of international trade. His main argument is summarized in the following: 'international trade overcomes the narrowness of the home market and provides an outlet for the surplus product above domestic requirements' (Myint 1958, 318).

One of the implications of his argument is, however, a differentiation from the traditional comparative costs doctrine, which argues that the process of specialization that takes place as a country enters international trade does not result merely in a

movement within the production possibility frontier, but also in an actual extension of the frontier (Myint 1958, 318–319). A second fundamental point of divergence is his understanding of a much greater ‘inelastic domestic demand and/or a considerable degree of internal immobility and specificity of resources’ (Myint 1958, 322). The implication is that countries that specialize in export, or produce a surplus for the international demand, become more vulnerable because that surplus cannot be used for domestic production since factors cannot easily readjust.

Myint states that an exception to this ideal Smithian innovative role of international trade can be found in the peasant export sectors in Southeast Asia (Myint 1958, 321). Here, the increases in land under cultivation for export took place under the same methods of cultivation as those used in the subsistence economy. This was nevertheless a development – a rapid one – that could be only achieved by a combination of excess land and labour. Thanks to the improvements in transport and communications, a growing demand for tropical products could be met by ‘the unlocking of the tropics’ (Knowles 1924, 119). Many of these economies expanded their cultivation based on the pre-existing subsistence peasant economy. Myint’s claim is that land was at a surplus, but there were no incentives for labour intensification until the development in communication infrastructures and the access to international demand. He takes the argument one step farther and warns the reader that the key to the understanding of such a significant expansion goes beyond the label of ‘peasant subsistence economy’, which is why other countries with similar climate and geography (such as India) did not also become major rice exporters at the time. According to Myint (1958), this was due to the determinant role of population densities or, more generally, of factor endowments. Consequently, in this understanding, colonialism changed the opportunity cost of labour, and incentivized farmers to trade off leisure (or extra activities of the slack season), but only under conditions of abundance of resources-to-person ratios.

Myint considers that economies, in general, are more vulnerable than the comparative cost theory predicts. As previously mentioned, the domestic market could not easily absorb the excess production. Contrary to what comparative cost theory predicts, neither the factors nor the productive capacity of countries are sufficiently mobile and flexible to readjust. Myint, however, makes a distinction between the less developed economies (e.g. the export economies of Southeast Asia and tropical Africa), and the more developed economies of Western Europe and the Americas that were also part of the expansion of international trade in the nineteenth century. He differentiates these two groups of economies in terms of their vulnerability. Although the more developed economies have reshaped their economy as a result of a process of ‘specialization’, the less developed economies ‘possess a sizeable surplus productive capacity which (even without any improvements and extensions) [they] cannot use for domestic production’ (Myint 1958, 322). These underdeveloped economies have not become more technologically advanced as a result of specialization induced by international commercialization; rather they have added production to their subsistence.

In case of an economic crisis, the more developed economies – because they have become more technologically advanced under the *assumption* of investments and human capital accumulation – could hypothetically reutilize such factors. The less developed group might fall back into subsistence with the likely implication of putting a considerable number of the population at survival risk. Therefore, for estimating the income

per capita of farming households, one must take into account the vulnerability to markets that these farmers were exposed to.

The predictions of the theory of vent for surplus can only be achieved *given* a surplus of both land and labour. As we have already argued, land intensification goes hand in hand with labour intensification; hence, in areas where increases in output per capita are achieved via intensification of land use, the surplus of labour (seen as units and person-hours) will be reduced. This implies that in areas of high population densities, where the frontier of arable land is closed (given the existing technology), there is barely any surplus labour. Hence, the economic opportunities brought about by the commercialization of the economy will be more limited.

In its application to West Africa (particularly the export sector), Myint's vent for surplus was modified by Tony Hopkins' (1973/2019, 285–289) seminal work. He proposes (2019, 287) three modifications of the assumptions before its application, namely (i) the mobility of labour and expansion of population in specific areas; (ii) the trade-off in production of traditional goods and services; and (iii) that increases in productivity of the export commodity were also a result of changes in farming practices. The outcome is a three- rather than two-stage development model, which leads to a lesser compression of history: starting from a small group of entrepreneurs specializing in export crops whose success might have led to the second phase, imitation by a semi-specialized farmer and, finally, rural differentiation and a larger group of specialists (Hopkins 2019, 288).

5.1. Vent-for-surplus theory: Its application and limitations

This paper further revises Myint's theory for understanding the significant expansion of the land frontier and economic growth when an external –arguably exogenous – factor causes surpluses of both labour and land. Similarly to Hopkins, we claim the conditions for the initial process of land expansion (i.e. where labour came from, its allocation, and origin of capital) require careful empirical investigation for each case. This theory cannot explain each single historical detail; however, it provides a potential mechanism to understand the process of the movement to a closing of the land frontier and its relation to specialization by varying degrees over time. Our objective, as already stated, is not to test this theory but to argue that the complex interaction of land and labour intensification may eventually lead to involutory processes, which in turn may hinder further transformation. The relationship between subsistence production and agricultural specialization becomes central to the implications of this discussion.

The vent-for-surplus theory has been used to explain many delta economies of Southeast Asia, at least until WWII (see Findlay and Lundahl 1994, 2017; Hayami 2001; Huff and Caggiano 2007; Thailand in Fuglie 1991; Ingram 1964, 1971; and Malaysia in Gunnarsson 1985). Criticism has mounted, however, in response to concerns about the theory's validity in the African context (Austin 2014b; Tosh 1980).

The main counterargument to the vent-for-surplus theory is whether significant inflows of capital and labour transformed the economies; in other words, whether the expansion of the frontier could be explained by permanent settlement of external labourers and/or technological progress. One of the difficulties comes from the trade-off with leisure, and the implicit acceptance of European stereotyping of the 'lazy African' (Austin 2014a, 1053). Indeed, that is most unfortunate, but Myint (1971) had no

intentions of stating that farmers were previously unoccupied. His theory considers the 'semi-idle labour of the subsistence economy' (Myint 1958, 320). It was Szereszewski (1965, 11) who found that, in the traditional economy, a bulk of human effort was held in reserve for leisure. This said, Szereszewski disagreed with Myint in 'his emphasis on the traditionality of the export crops which generate the process of growth. This need not be the case; in our instance both technological innovations and capital formation on a large scale took place' (Szereszewski 1965, 77, n 5). That is, in Szereszewski's opinion, Myint's vent for surplus may not apply to Ghana. The implication is that even if these two authors (Myint and Szereszewski) shared a similar Smithian view of foreign trade – both are vent-for-surplus theories – their understanding of the processes generating the surplus differed: one is classical whereas the other is neo-classical.

A potential argument to validate Myint's theory might be found in the engagement of farmers in joint products. Surplus capacity was somehow latent; if farmers had produced in excess and oversupplied the market with derivatives of, for instance, rice (i.e. alcohol), or even produce from their gardens or animals, without an effective demand, these products would have become a 'free' good – that is, at zero price (see Kurz 1992, on his interpretation of Smith's vent for surplus). Foreign trade could consequently become a vent for surplus. This does not exclude, however, the importance of indigenous agency and significant coordination to mobilize the needed capital investments.

Myint's theory does not exclude the possibilities of some farmers fully specializing. Nonetheless, without major inflows of capital and labour, there should have been an abundance of labour inputs (person-hours) to engage in, for instance, cocoa production without putting their subsistence at risk. If one wants to argue that all farmers specialized, one should identify greater diversification of the rural economy (Timmer 1997) and/or increasing imports of basic goods to substitute subsistence production; this would imply a transformation of household production from subsistence to specialization. In other words, the new activities competed against subsistence farming activities instead of complementing them. This, however, does not appear to have happened – at least initially – for the cocoa case in Ghana. In the case of rice, another major export crop, the lack of specialization is harder to ascertain because rice was the subsistence crop. Myint maintained that the farmers added production to subsistence, which is implicitly supported by the lack of technological progress. It is, however, important to analyse the economies' specialization and diversification at both the macro and micro levels, and to show that the lack of diversification of many of the frontier agrarian economies may also be interpreted in this realm.

Consequently, we propose two further modifications to the theory resulting from the importance of stressing that we are discussing processes: periodization and interaction of factors is analytically fundamental, and so is the nature of the crops. The remaining main challenge to the theory is whether the extension of, for instance cocoa, could have been achieved without major technological breakthrough (Austin 2014a). In other words, we need to question whether there is a shift in the production possibility frontier. Here, similarly to the claim made by Hopkins, we need to take a stage-oriented approach to its applicability. Let us assume that cocoa seeds are available. The fact that this is not a temporary crop –but permanent – means that it was very unlikely that its (initial) sowing and cultivation would have replaced existing arable land, that is, land used for temporary crops (likely for subsistence production). Furthermore, if its initial production was not

accomplished by significant new labour inputs (workers), one could argue that there was no shift in the production possibility frontier. Trade might arguably be a vent for surplus until specialization was possible for a significant part of the cocoa farming population (Gunnarsson 2018, 129–133). More insightful would be to look into the production and expansion of temporary crops – for instance, groundnuts – in Nigeria (Hogendon 1978) and other West African countries by small-scale peasant families²⁰ (Havinden 1970, 548–549), to assess whether this was initially done as a complement to subsistence production and to cater for exports.

The criticism for the African context, however, brings the limitations of the theory into focus. The premise of the theory is that given a surplus of both land and labour, but without a major shift in the production possibility frontier, the returns to both land and labour would be subjected to diminishing returns. At this point, the theory does not shed much light on whether it is the lack of opportunities to invest or availability of technology that hinders the long-term transformation of the rural economies under study. If (or better, when) the frontier closes, and labour becomes scarce in relation to land (now used more intensively), the potential for involutory processes to take place is likely to increase. This, as argued previously, may lead to farming households becoming trapped at subsistence. Therefore, growth obtained via a vent for a surplus may lead to a high-level equilibrium trap, especially if land becomes fragmented and is intensively cultivated (both in its use and labour inputs).²¹

6. Concluding remarks and implications

The main bulk of this paper has been concerned with providing potential theoretical explanations for two dynamics in agriculture, with differences in factor endowments as the initial conditions. It is thus proposed that economies with such differences in factor endowments are best understood if treated as independent units of analysis. The second aspect is, consequently, that the processes of land intensification, though different, would have been achieved at least *initially* at the expense of labour productivity, and within the limits of a traditional production possibility frontier. In order to increase surplus production, as investments tend to focus on land intensification – and barely ever on labour-saving technologies – labour remains abundant in relation to land initially. This may not preclude phases of economic growth, but neither will it lead to economic structural transformation. By lifting the neo-classical constraints on factor relationships, we can pinpoint the dynamics derived from factor endowments that partly preclude the transformation (in contrast to à la Hayami and Ruttan). The potential for surplus generation is, however, much more limited in an economy with high population densities and a closed arable frontier, than in an economy where farmers could intensify land use by putting new land under cultivation (given no major institutional barriers to labour mobility, neither permanent nor seasonal). In the case of the former, increasing population pressure without a substantial technological change would lead to HLET. For the latter, the potential for increasing output per capita is greater, but the effect on improvements

²⁰In contrast to production by slaves (e.g. Salau 2010 for groundnuts), and the revisionist article by Austin (2009).

²¹For modern Africa, much scholarly work has focused on the effects of excessive land fragmentation, especially in customary lands (e.g. for a general take on SSA see Headey and Jayne (2014); comparatively between Ghana and Rwanda see Blarel et al. (1992), and for Tanzania see Kadigi et al. (2017)).

in income per capita and avoiding falling into involutory processes would require further empirical investigation.

By providing empirically derived hypothetical generalizations (Gerschenkron 1962, 6), based on factor endowments as our initial conditions, the next step would be to apply this theoretical framework to different economies. For the case of regions with high population densities in a closed frontier, the HLET is inferred from Chinese evidence and has remained central to, for instance, the Great Divergence debate (see Little 2010, chapter 8). But at present, the concept has been used elsewhere (India and the Roman Empire in Lal 2010, 9–10; Giacometti 2000 and López Jerez 2018, for Vietnam). This understanding has significant implications for the possibility of a permanent release of labour to other farming regions or out of agriculture if the production surplus (not least subsistence) cannot be maintained.

In relation to the vent for surplus, the line of further inquiry may not be on questioning its validity as a theory, but rather on moving the analysis to the micro level, specialization vs subsistence household production (particularly focusing on new complementary or substitute production to subsistence), and the distribution effects. The strength of Myint's theory is that it helps us understand the incentives behind the lack of major technological progress. As long as there was surplus land and labour (via seasonal migration or further familization of rural production), output surpluses could be generated with traditional technology and without intensifying land use (given the access to external demand and relatively stable prices). But, unfortunately, this theory does not assist us much in explaining why the agricultural sector of these economies did not become a driver of industrialization by some of the Johnston–Mellor linkages, namely by providing at least food for industrial workers, a taxable surplus capacity and foreign exchange to import capital goods (Johnston and Mellor 1961). The question, of course, is whether there was truly a market for industrial outputs (a fundamental linkage in all the theories discussed above). This opens up new venues for empirical investigation.

The failure of most of these economies to industrialize is often explained by colonial extraction. Colonialism must have had an effect in these economies (there is no null hypothesis), and the understanding of its short- and long-term effects and mechanisms remain contested. Farmers (see peasant production) did indeed respond to the new incentives, and socio-economic changes might have taken place despite – or more likely, due in part to – colonialism. We propose to reach a deeper understanding of the different actors (farmers as producers and consumers, traders) by focusing on the institutions that condition the economic options (saving and investment) of the farming population (in colonized and independent countries) in access to land, technology, and skills.

If the economic strategies followed during colonial times or as independent states do not address the potential hindrances that the poor suffer to improve the productivity of their main assets (labour and land), given that the poor are typically the farmers of the economy, the agricultural transformation would likely be stalled with the potential effects on the structural change of the economy. Neither can the role of factor endowments be understated in this framework. Provision of education, investment in infrastructures, access to markets, etc., may be harder and costlier to achieve in frontier economies. The frontier will, however, close – and if new investments are not made (either by structural barriers or hinderances at the micro level), the cultivation system is likely to be

adjusted to the labour availability, which in turn may lead to involutory processes, hindering the full release of labour and consequently moving beyond subsistence. This may lead to a development trap. Economic growth, under these conditions, may take place, but it will not endogenously bring development.

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